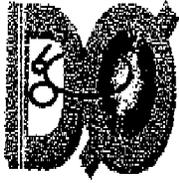


SVX 2 Noise

Marvin Johnson

May 1, 2003

1



Oscillations

- See SVX oscillations after preamp reset
 - Observed in CFT, SMT and CPS
 - Likely ground bounce
 - See the affect in SIFT output
 - All channels have the same response
 - Too large a geometry diff for C coupling.
- SVX 2 is not Ground referenced
 - Reference is analog supply voltage
 - Tied to ground via capacitor
- Likely culprit is ground moving and coupling into input (SIFT or SVX 2 in SMT case)

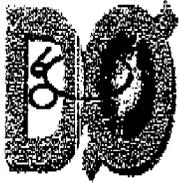


More on OSC.

- **CPS data for same channel with 100 and 12 pf coupling**
 - Ratio is about 1.7 while C ration is over 8.
 - Simple analytical calculation gives ratio of 2.5
 - Depends on input impedance of amplifier
 - Assumes coupling through input cable
 - Requires variation in voltage in ground voltage between SIFT ground and cable ground
 - Otherwise no signal at all
 - » Cable is off MCM so not unreasonable

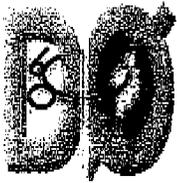
May 1, 2003

3



Pedestal split

- **Observe pedestal split in CFT system**
 - Only appears in every other crossing
 - Split is almost exactly 50-50
 - Looks like a harmonic of $RF/4$
 - Require resynch per turn
- **Good guess is that we are introducing a stable oscillation similar to preamp oscillation**
 - Paul Rubinov removed reset in 2 of 3 gaps
 - Middle gap went from odd-even to even-odd.
 - There is a 264 ns phase jump before the middle gap so this shift is what one expects

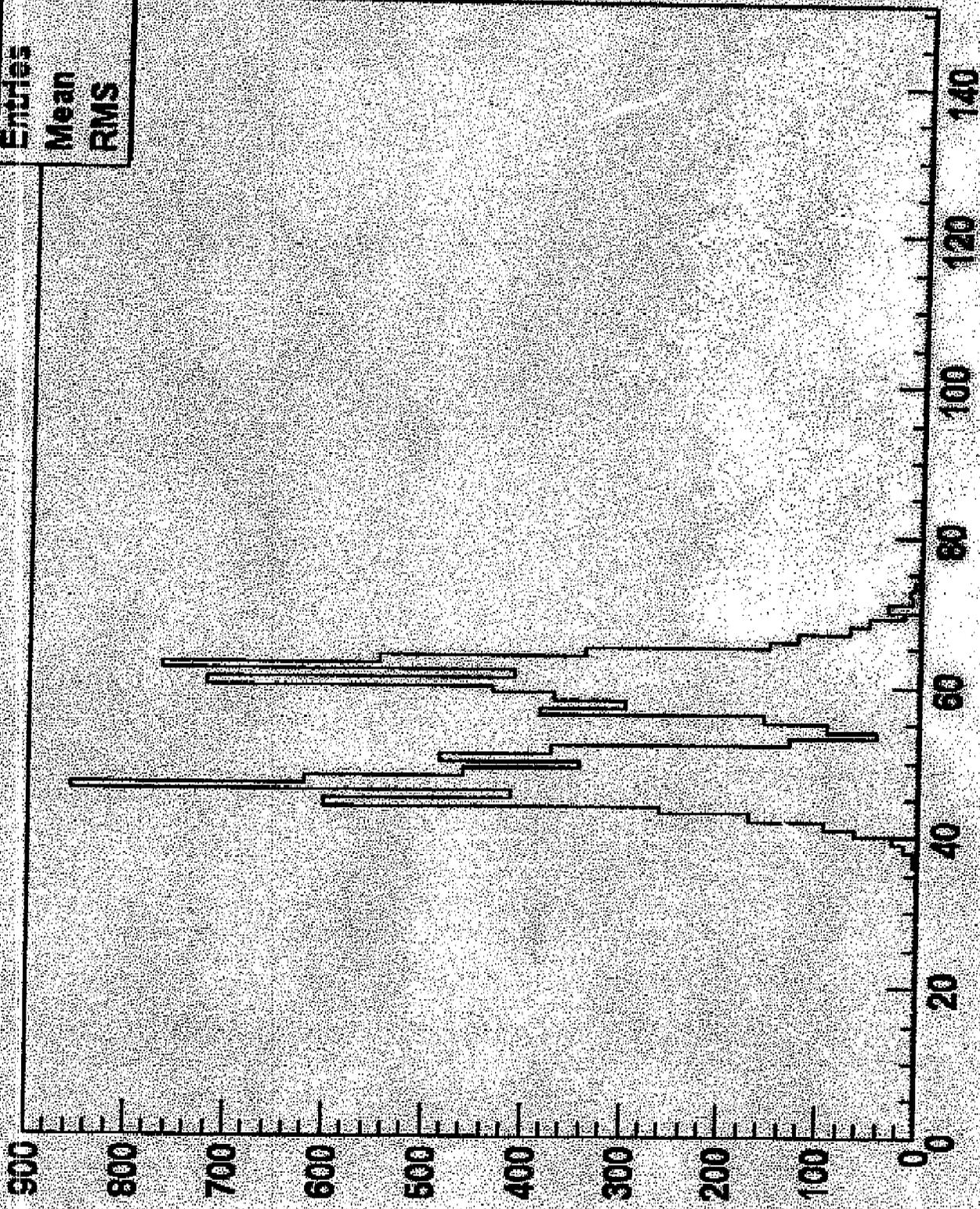


Ped splits

- Looks like ground bounce excited by 2 different signals
 - Preamp reset for SVX
 - PCLAMP signal for CFT system

1B0svx7chan63

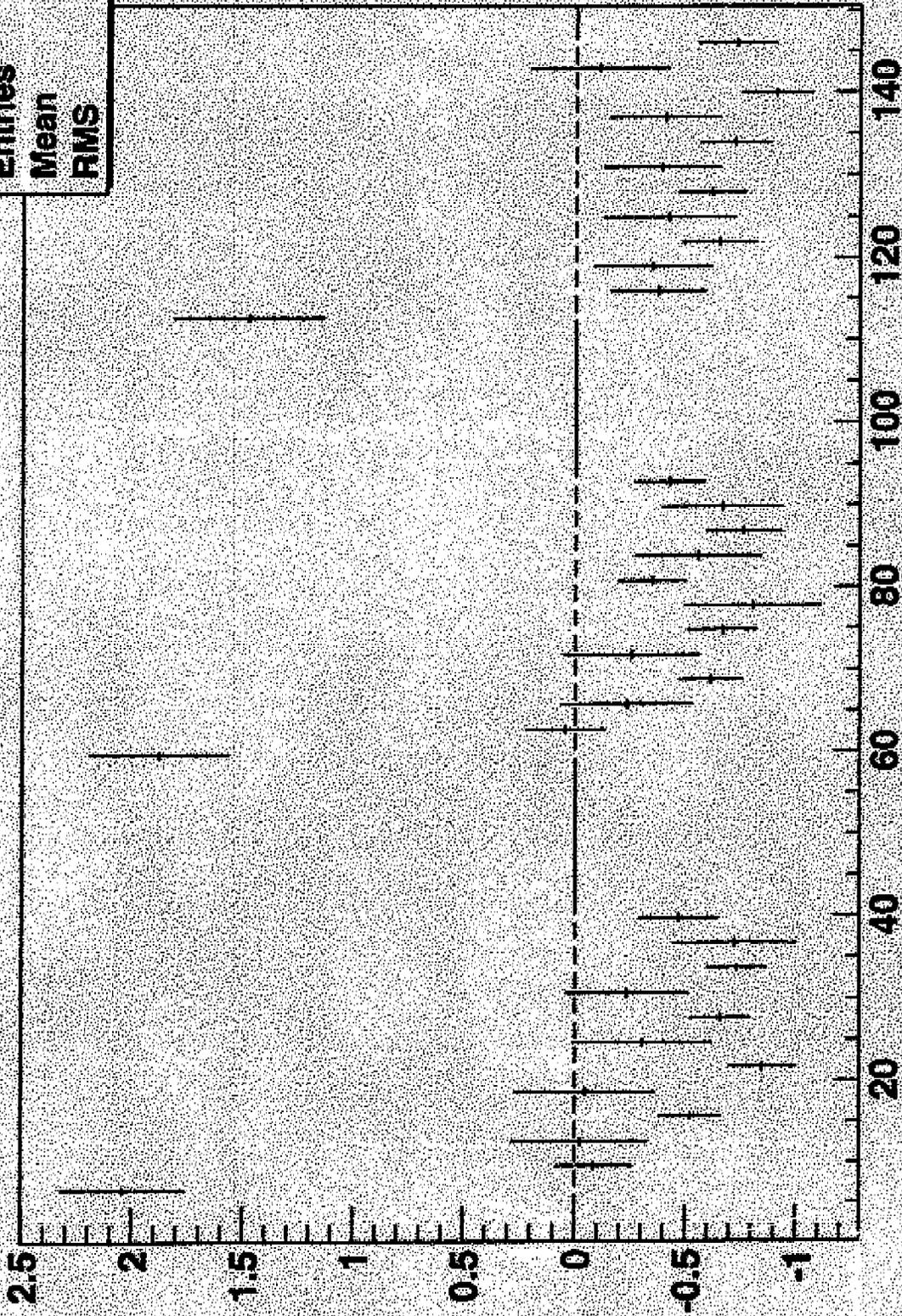
afe00svx7chan63	
Entries	0
Mean	64.17
RMS	7.705



12 PF CAP

ade vs tick

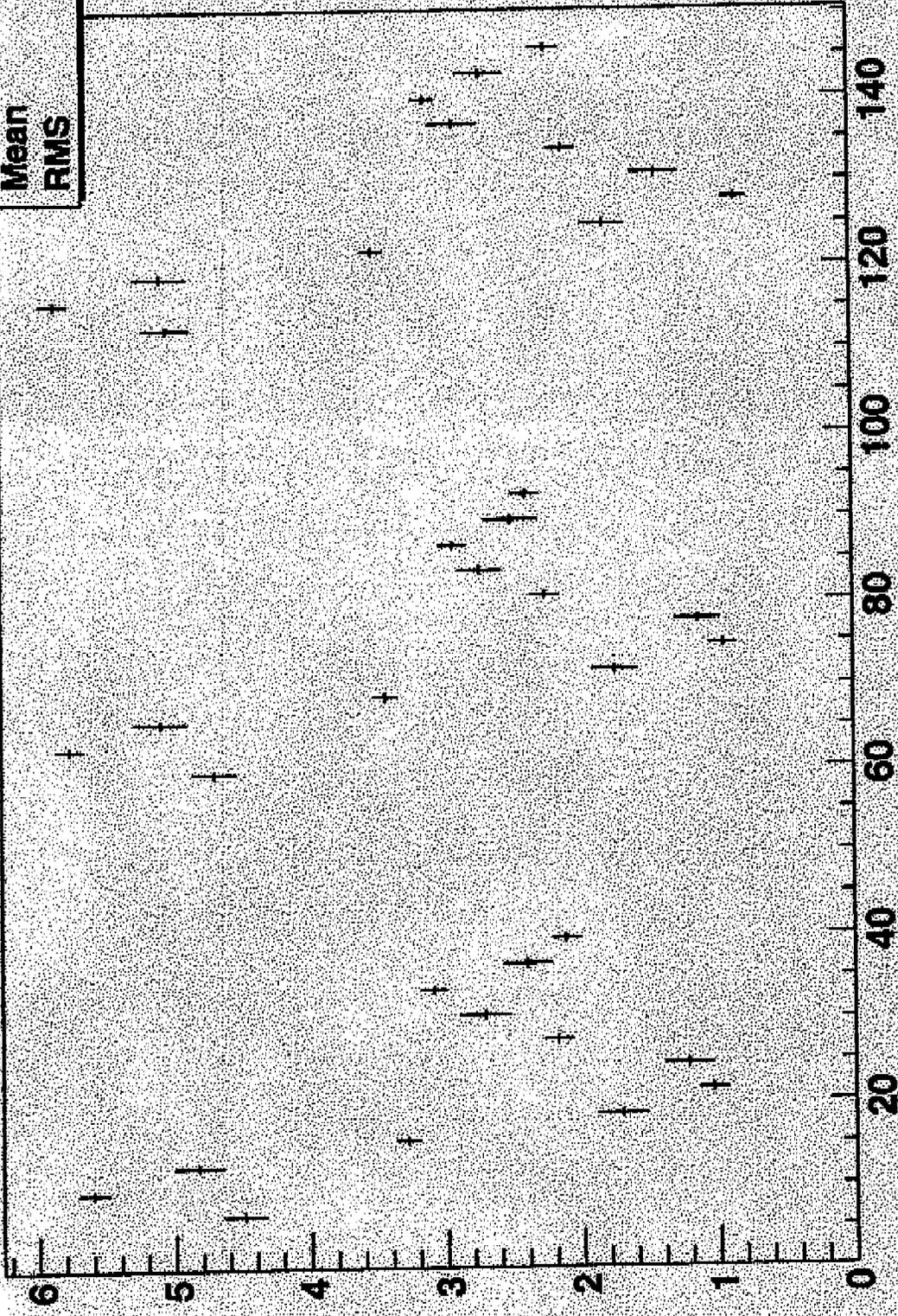
	adctick6	pix
Entries	1618	
Mean	76.08	
RMS	44.63	



100 f f cap

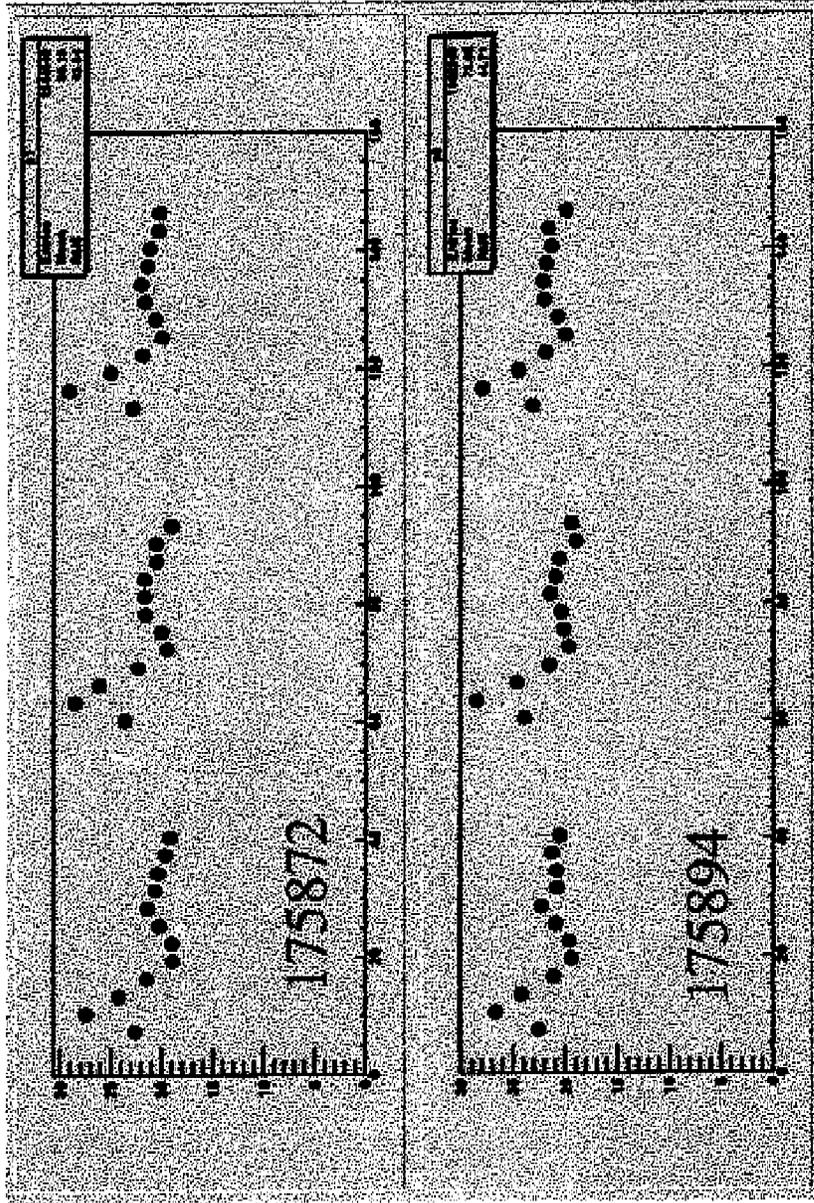
ade vs tick

adctick6	pfx
Entries	5733
Mean	75.86
RMS	45.03



Sector Occupancy

- Two runs at 10e30 from two different stores



Tick number

Disc Outputs

10e30

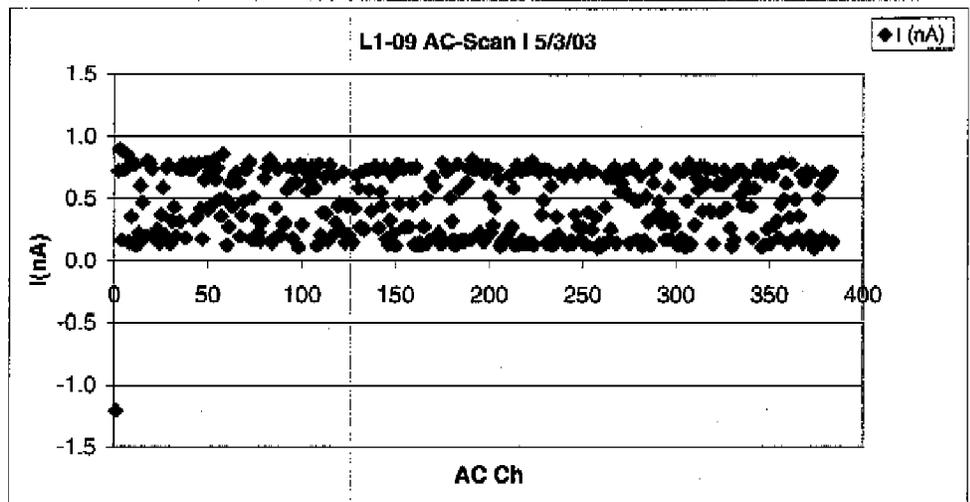
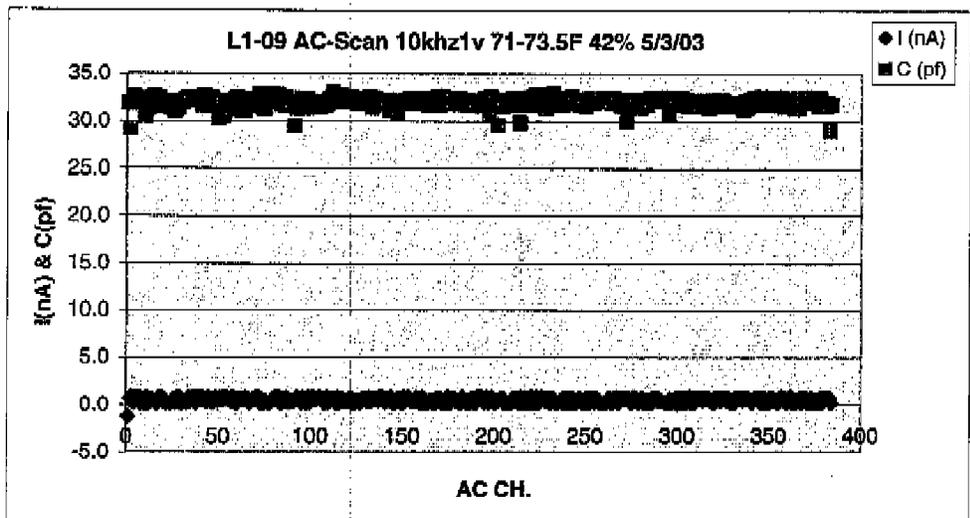
*Disc
Occupancy 64*

*~2-3 times
higher
occupancy*

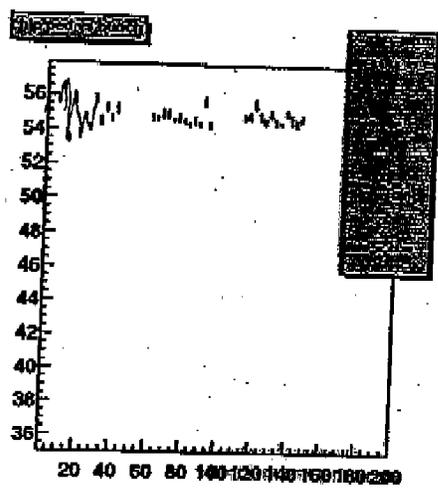
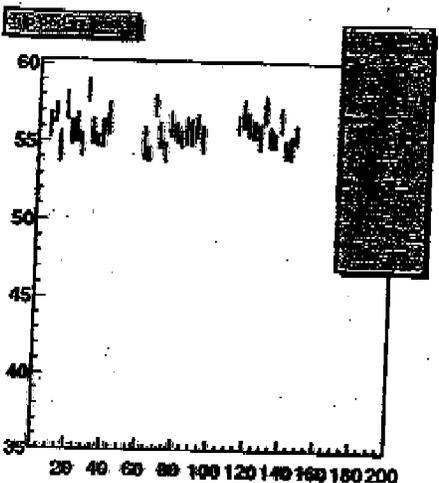
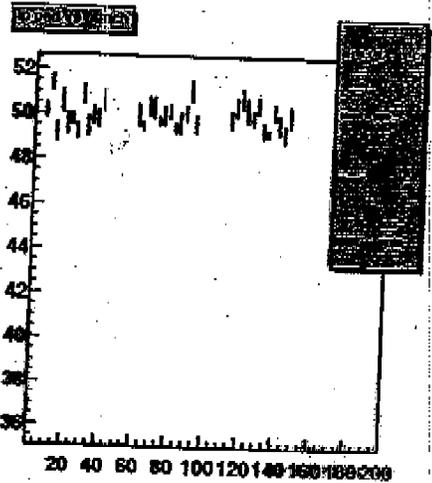
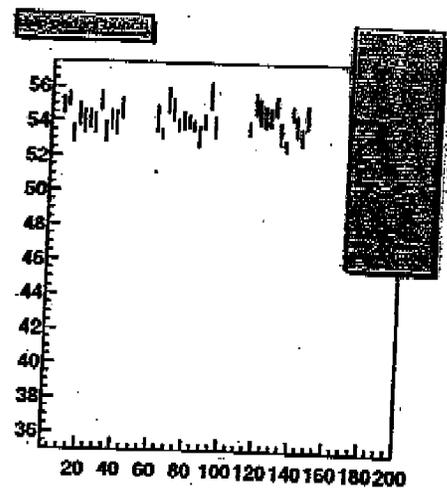
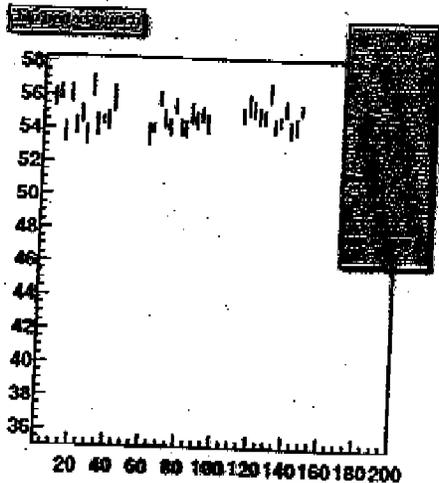
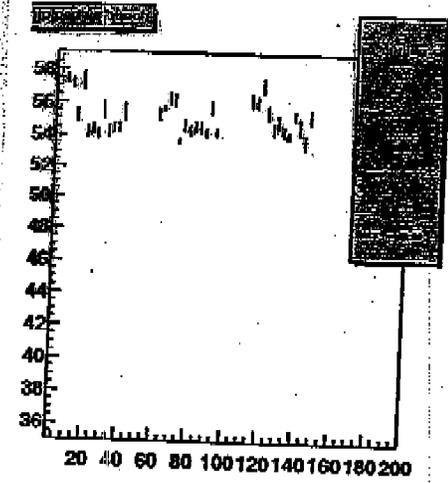
*from
CTEC
Z*

SVX Occupancy as a function of a tick number



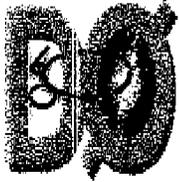


After delay time change, of AC-Scan
I (nA) ok,



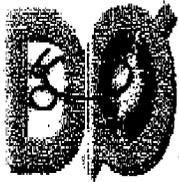
SMT DATA $\tau \approx .8 \mu s$

FACTOR OF 4 FASTER
THAN CFT



Food for Thought

- Preamp reset noise should not be unique
 - Ramp reset etc use the same register
- CFT has more SVX problems than SMT
 - Charge split between 2 pipeline cells etc.
- CFT has about 4 times the preamp reset oscillation
 - Is the wait at the end of digitize just letting these oscillation die out to restart the SVX?



What to do

- Good practice is to separate analog and digital grounds
 - More layers in hybrid
 - More cost
 - Difficult to get flat hybrids
 - Requires new digital cable
- SVX 4 is ground referenced so it might be OK

Split peds seen in XING 1 and 3 and not 2. For these runs, only xing 1,2 and 3 are available.

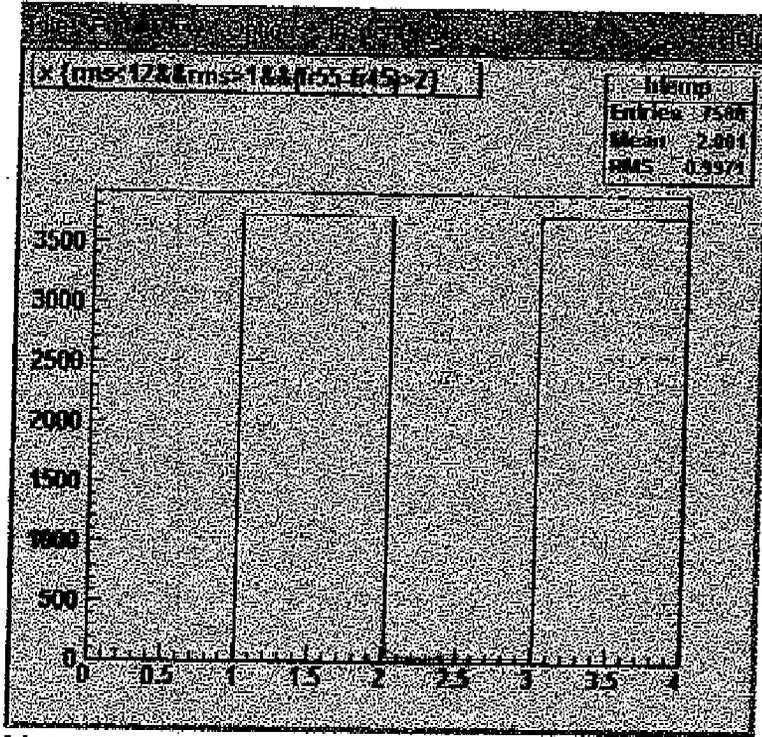


Fig2